AMENDMENTS TO THE CLAIMS:

For the purposes of this admendment, the below listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claims 1 - 41. (Canceled)

Claim 42. (Currently Amended) A method for assessing a health status of a system of conduits, the ~~determining~~ assessing comprising:

determining requirements for monitoring the system of conduits; and

selecting parameters to be sensed and monitored; and

selecting components consisting of electronics, hardware, software, firmware, ~~and~~ a set of discrete sensors and ~~strips~~ strands of sensitized medium ~~to implement said functions~~; and

designing and manufacturing a form and fit of [[the]] a monitoring device comprised of said components; and

applying, placing, attaching or embedding the monitoring device and sensors consisting of ~~at least one strand~~ discrete sensors and a multiplicity of strands of said sensitized medium along the length of a conduit, ~~wherein said strands of sensitized medium has a first end and a second end,~~ said set of discrete sensors and strands of sensitized medium being placed such that damage inducing factors ~~such as a solid object, gas, liquid, powder or electromagnetic waves contact~~ affect said set of discrete sensors and stands of sensitized medium ~~prior to contacting a conduit~~; and

determining by a combination of measurement by signal processing and deductive algorithms whether, when, where and to what extent said damage inducing factors have ~~damaged each of said multiplicity of strands of sensitized medium~~ caused damage; and

~~comprising the steps of:~~

with an algorithm using said monitoring ~~apparatus~~ device to periodically monitor at least a portion of the ~~said system of~~ set of discrete sensors ~~at given points in time~~ over a first extended period and, for each ~~point in time~~ monitor, storing in a digital memory a data ~~couplet~~ tuplet containing information concerning said parameters, ~~and a the point in time~~; and

~~using analog circuits to condition, sample, hold, and digitize the signals from the said sensors into parameter values; and~~

forming tuplets that represent the time of the sample, identity of the sensor, and said parameter values; and

using digital processor algorithms to identify tuplets having normal values within a predetermined range; and

providing an indication of steady state characteristics if said parameter values for at least a predetermined number of tuples are within a first predetermined range; and

providing a programmed diagnostic algorithm for assessing risk of damage to the ~~sensor~~ set of discrete sensors and extent of deterioration and damage to the monitored conduits; and

providing an algorithm for estimating remaining useful life of the monitored conduits and components; and

providing a protocol for communicating information about sensed damage, deterioration, ~~and~~ as well as diagnostic information concerning a health status and integrity of the monitored conduits, components and system of conduits; and

performing a first test sequence on each of the multiplicity of said strands of sensitized medium for the purpose of forming a baseline of characteristic parameters of each said sensitized medium for future reference by measuring the characteristic parameters and storing characteristic parameters in an accessible storage medium or location for future use; and

from time to time performing the same said first test sequence on each of the multiplicity of strands of sensitized medium; and

making a test measurement of said strands of sensitized medium for the purpose of determining if said measured characteristic parameters are substantially equal to previously measured characteristic parameters, the possible outcomes being:

there is no measurable change to the sensitized ~~portion of the~~ medium; and

there is measurable change to the sensitized ~~portion of the~~ medium; and

the medium is disrupted, broken, eroded, cut through or dissolved; and

choosing whether to repeat said step of making a test measurement of said sensitized medium; and

if the choice is to repeat, then repeating said steps of measuring the characteristic parameter and determining; and

if said measured characteristic parameters are substantially equal to previous measured characteristic parameters with the digital processor, using a deductive algorithm along with any a priori probability information to:

process data from said measuring of said multiplicity of sensitized medium into characteristic parameters ~~information~~; and

determine any change of said characteristic parameters from recorded characteristic parameters; and

record the characteristic parameters for later use; and

choose whether to measure to locate the change; and

if the choice is to locate, then measure using either direct calculation based on response to ~~the applied signal; or apply~~ a measuring technique; and record [[the]] a measured value and temporal information if available; and

using a calculus estimate [[the]] a degree of damage for each said sensitized media at each recorded point of damage, for each time if temporal information is recorded.

Claim 43. (Canceled)

Claim 44. (New) The method of claim 42 wherein the algorithms predict future local, system and other effects of damage.

Claim 45. (New) The method of claim 42 wherein the parameters are a single-ended measure of characteristics of light.

Claim 46. (New) The method of claim 42 wherein parameters measured at spaced apart locations along the branches are used in an algorithm to resolve ambiguities caused by a plurality of sensitized media in a branched tree of conduits.

Claim 47. (New) The method of claim 42 when implemented with wireless communication devices.

Claim 48. (New) The method of claim 42 when implemented with means to warn of stresses and other situations that potentially would result in damage to components of a system of conduits.

Claim 49. (New) The method of claim 42 which includes a means to quantitatively measure changes in signals and secondary effects as a means to detect the presence, degree, and location of deterioration or damage.